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The Impact of Military Life on Spouse Labor Force Outcomes

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for

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THE IMPACT OF MILITARY LIFE ON SPOUSE LABOR FORCE OUTCOMES

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THE IMPACT OF MILITARY LIFE ON SPOUSE LABOR FORCE OUTCOMES

I. INTRODUCTION AND BACKGROUND

The focus of the research presented in this paper is the impact of Army life on spouse employment. Since the 1980 Army Family symposium, spouse employment has become a primary target for policy and program development because of the concern that Army life can create special problems for families in which the spouse needs or wants employment and career opportunities. Spouse employment is thought to be an important factor in the member's commitment to Army life, job performance, military readiness, and the retention of enlisted personnel and officers. The importance that the Army places on spouse employment and its expected relationship to readiness and retention is clearly indicated in the White Paper 1983: The Army Family (Chief of Staff, U.S. Army, 1983) and The Army Family Action Plan II (Headquarters, Department of the Army, 1985). There is a concern that if being in the Army limits a spouse's ability to pursue satisfactory employment opportunities then there will be a significant negative effect on both member commitment to Army life, readiness, and retention. Because of these concerns the Army has initiated a series of policies and programs directed towards the enhancement and facilitation of spouse employment.

These concerns are not unique to the Army. Many organizations have recognized the influence of the spouse on employee productivity, job commitment and retention (Pittman & Orthner, 1988) and have increased their responsiveness to spouse needs.

This paper examines the underlying determinants of Army wives' labor force participation, employment, level of employment, and underemployment, with a focus on the effect of on-post spouse employment programs and other Army policies on these outcomes. The research is based on the 1985 Department of

Defense (DOD) Member and Spouse Survey data developed jointly by Research Triangle Institute and the Defense Manpower Data Center (Griffith, 1986, McCalla, 1986).

Section II describes the theoretical model for the analysis of labor force participation and other work outcomes. Section III gives a description of the 1985 DoD surveys and the sample data. The estimation method and regression and simulation results are given in the Section IV, and Section V summarizes the main findings and policy implications of the study.

II. ECONOMIC MODEL OF LABOR SUPPLY OF MARRIED WOMEN

In this section we briefly outline the well-established economic model of labor supply for married women, and describe the unique factors that are likely to be related to the labor force participation of Army wives.

The original framework for the analysis of women's participation in the labor force was developed by Mincer (1962) and has been used extensively to estimate labor supply functions for married women.¹ The labor supply model for an individual is based on a utility maximizing choice between income and leisure. Assuming that leisure is a normal good and that the substitution effect is greater than the income effect, an increase in the wage rate will increase the individual's supply of labor. Becker (1965) expanded the individual labor supply model to include the family as the decision making unit. In his household production model a utility maximizing household decides whether the wife will be in the labor force based on her market wage rate relative to the value of her time spent at home (her reservation wage). If time spent working at a job away from home more than compensates her for time lost in "home production" then she will choose to work in the market labor force, all other factors held constant.

The outcome of the household utility maximization process is that a woman's choice of whether to participate in the labor force will be determined by her market wage, her reservation wage, and personal tastes and preferences. The empirical approach is to estimate a reduced-form labor supply model, including variables related to the spouse's potential market wage and her reservation wage, plus a set of other socioeconomic and demographic factors.²

In addition to modeling whether the Army spouse participates in the labor force, we build on this framework by modeling three other work related

outcomes. First, for those women who are in the labor force, we examine the determinants of whether they are employed. Second, for those women who are employed, we model whether they are full-time workers. Third, for women who work, we develop a model of underemployment which examines the correlates of whether they use their acquired skills in their job.

Human capital theory suggests that education and work experience are important determinants of the potential market wage. We expect that the spouse's years of education will have a positive effect on wages and labor force participation. Because we do not have work histories for the women in our sample, we proxy labor force experience by creating a variable which measures the potential years of work experience, and we also include its squared value. We expect a positive relationship between this proxy variable and labor force participation, and a negative relationship between the squared experience variable and participation. This is consistent with the notion that the wage rate (and therefore labor force participation) increases with experience up to a point, and then declines. Education and experience are also expected to be important determinants of whether the spouse is employed, whether she is employed full-time, and whether she has a job which uses her skills.

Market wage rates are also known to be negatively influenced by interruptions in work. Interruptions may be an especially important determinant of the Army spouse's wage rate due to the frequent number of Permanent Change of Station (PCS) moves over the course of the member's military career. In addition, a PCS often requires an adjustment period to the new location and search time to find new employment. For these reasons we expect the length of time at the current location to be positively associated with the market wage and labor force participation. The length of time at the location is also

expected to positively influence whether the spouse is employed and whether she is employed full-time. Participation is also likely to vary substantially between continental U.S. (CONUS) and outside continental U.S. (OCONUS) locations, and by the relative proximity to population centers. We expect location in CONUS and proximity to population centers to positively affect labor force participation, employment, whether the wife works full time and whether the wife uses her skills.

The spouse's reservation wage, a measure of the value of her time spent in home production (i.e., the opportunity cost of spouse employment) is likely to be influenced by whether or not there are children in the household, and particularly by the age of the youngest child. A household which faces day care costs for pre-school aged children may find the net income contributed by a working spouse too small (perhaps even negative) for it to be worthwhile at the margin. We expect these demographic "life course" factors for households with young children to increase the reservation wage and decrease the likelihood that spouses in these households will be in the labor force. The presence of pre-schoolers may also influence other work outcomes. Women may be less likely to be employed or employed full-time if their available work hours are constrained by available day care hours. In addition, women may be forced to take jobs which do not match their skills in order to accommodate day care constraints.

Other family income, particularly the member's salary, may influence the household's economic need for additional income. We expect that households with low member income will be more likely to have the spouse in the labor force and for her to be working full-time, all else equal. Other characteristics of households, including whether the husband is an officer or enlisted man, and the ethnic background of the household, may be useful as

proxies for individual and household tastes and preferences in certain work outcome models. In addition, in our model of underemployment we include the spouse's motivations for working (economic need or to gain experience) as determinants of whether she uses her acquired skills in her job.³

Finally, and perhaps most importantly for this analysis, we include one more Army policy factor which is likely to influence the spouse's work outcome directly-- whether the woman is at a location that has an on-post spouse employment service. This policy variable is used to examine the effectiveness of such services for labor force participation, employment, full-time employment and underemployment of spouses. Other Army policy variables, already discussed, include the length of time that the household has been at the location (i.e., policy related to the frequency of PCS moves) and whether the assigned location is CONUS or OCONUS.

III. DATA AND VARIABLE DEFINITIONS

The 1985 DoD Surveys

This section provides an overview of the 1985 DoD Surveys of Officer and Enlisted Personnel and Military Spouses (Griffith et al 1986, McCalla et al 1986). Together these surveys produced two primary data files: a Member file which includes officers and enlisted personnel and a Spouse file which includes spouses only. A subset of the 1985 DoD Spouse Survey is the primary source of data for this research. The data set was constructed by selecting all female, non-military, Army spouses from the Spouse file. Several income variables from the Member file were merged with the Spouse file to create the final data set, referred to as the Army Couple file. The Army Couple file has 9083 observations and includes both officers' spouses and spouses of enlisted personnel.

A brief description of the design used in conducting the surveys and the data collection follows.⁴

Sample Design

The basic stratification variable for the 1985 DoD Surveys was Service. Within each Service, the enlisted personnel were stratified by length of service (4-47 months and 48 months or more) and sex, and the officers only by sex.

The population from which the 1985 DoD Member Survey was sampled consists of active-duty officers and enlisted personnel who were stationed in the United States or overseas on 30 September 1984. Enlisted accessions with less than four months of service were excluded. Within each stratum, a random sample of military personnel was selected.

The sample for the 1985 DoD Spouse Survey was derived from the sample for the 1985 DoD Member Survey. The Spouse Survey was an attempt to census spouses of married military members who were selected for inclusion in the Member Survey.

Data Collection

The sample selected for the 1985 DoD Spouse Survey consisted of a total of 20,066 Army spouses: 5,282 officers' spouses and 14,784 spouses of enlisted Army personnel; of these 4,417 were officers' wives and 13,775 were wives of enlisted Army personnel. Data collection for the 1985 Spouse Survey began in February and ended in July, 1985. The majority of the questionnaires, however, were filled out in March, April, and May. Of the total of 18,192 eligible Army wives, 9679 returned usable questionnaires.

The sample selected for the 1985 DoD Member Survey consisted of a total of 7,912 Army officers and 34,601 enlisted personnel. Data collection for the Member Survey began in January 1985 and ended in June, 1985. The majority of the member questionnaires, however, were filled out in late February and March, 1985.

Because the sampling plan allowed for disproportionate sampling among subgroups in the DoD population and because sampled subgroups did not respond to the survey in identical rates, differential weights are assigned for the different subgroups. The population to which the survey data base is assumed to apply is the DoD population with 10 or more months of service as of 31 March 1985.

Variable Names and Definitions

The variables used in the analyses are taken from the Army Couple file described above. Table 1 provides a complete listing of all variables and definitions.

TABLE 1. VARIABLE NAMES AND DEFINITIONS

Dependent Variables

LFP	dichotomous variable set equal to 1 if woman is in the labor force and zero otherwise
Employed	dichotomous variable set equal to 1 if woman is employed and zero if woman is unemployed
Full-time	dichotomous variable set equal to 1 if woman works full time and set equal to zero if woman works part time
Uses Skills	dichotomous variable set equal to 1 if woman uses her training, job skills or experience a great deal or completely at her current job. Equals zero if woman uses her training, job skills or experience somewhat, very little or not at all.

Independent Variables

Education	number of years of schooling completed.
Black	dummy variable set equal to 1 if woman is black; zero otherwise.
Hispanic	dummy variable set equal to 1 if woman is hispanic or spanish; zero otherwise.
Other	dummy variable set equal to 1 if woman is neither black, hispanic nor white; zero otherwise.
White	dummy variable set equal to 1 if woman is white; zero otherwise. (Omitted category).
LCNO	dummy variable set equal to 1 if no child dependents at location and spouse is age 29 or younger. (Omitted category).
LC0-5	dummy variable set equal to 1 if youngest child at location is age 0 - 5.
LC6-11	dummy variable set equal to 1 if youngest child at location is age 6 - 11.
LC12-17	dummy variable set equal to 1 if youngest child at location is age 12 - 17.
LC18+	dummy variable set equal to 1 if youngest child at location is age 18 or older OR no children at location and spouse age 30 or older.

TABLE 1. VARIABLE NAMES AND DEFINITIONS (CONTINUED)

Conus	dummy variable set equal to 1 if present geographic location is continental U.S. Equals 0 if location is outside continental U.S.
Experience	age minus years of schooling, minus 6.
Distance	spouse rating of distance to population centers, 1 is very poor (long distance) and 5 is excellent (very close).
Husband's Wages	member's annual taxable military income, in thousands.
Months at Locale	number of months at present locale.
Spouse Emp. Program	dummy variable set equal to 1 if spouse employment services are available on post. Set equal to 0 otherwise.
Officer	dummy variable set equal to one if member is an officer. Equals 0 if member is enlisted.
Work Career	dummy variable set equal to 1 if 'planned to have career,' 'independence/self-esteem,' 'enjoy working,' or 'gain experience for future career' was a major contribution in decision to work. Equals zero otherwise.
Work Basic Needs	dummy variable set equal to 1 if 'needed money for basic family expenses' was a major contribution in decision to work AND 'planned to have career,' 'independence/self-esteem,' 'enjoy working,' and 'gain experience for future career' were either minor contributions or no contribution in the work decision. Equals zero otherwise.
Young Child	dummy variable set equal to one if youngest child at location is 0 - 5 years old. Equals zero if child is 6 - 11 or if there are no children 17 or younger at location.

Summary Statistics

Means, standard deviations, and ranges of all analysis variables for the Army Couple sample are included in Table 2. Summary statistics of variables by sub-sample for each model are given in Appendix Tables A1 through A4.

The summary statistics indicate that the average Army spouse in the sample has about one year of college education, is about 31 years old,⁵ has lived in the same location a little over 23 months, has a husband who earns an average of \$20,234 per year, and has had available about 12 years for labor force participation (potential experience). About 16 percent of the sample spouses are black, 7 percent are Hispanic, 9 percent other, and the remainder white.

About 46 percent of the sample have children under 6 years old, 68 percent have children under 12 years old, and 79 percent have children under 18 years of age. About 69 percent of the sample spouses live in the continental U.S. (CONUS), and 53 percent have available a spouse employment program on-post. Of the sample spouses who work, nearly 10 percent report that the only reason they work is to meet basic family expenses, while nearly 66 percent report that they are working because they plan to have a career, or because they enjoy working.

Description of Army Spouses by Outcome

In Table 3 we present selected characteristics of military spouses by each of the four work-related outcomes. Sample weights are used to calculate these estimates of the percent of the total population of Army spouses in each category shown. These cross-tabulations also serve to illustrate the simple underlying relationship between the independent variables and each of the outcomes.⁶

Over half (53 percent) of all Army spouses are in the labor force, with 77 percent of these employed, 67 percent of the employed working full-time, and 55 percent reporting that they use their skills in their job.

TABLE 2. SUMMARY STATISTICS

VARIABLE	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE
LFP	0.5429	0.4982	0.0000	1.0000
EMPLOYED	0.7847	0.4111	0.0000	1.0000
FULLTIME	0.6606	0.4736	0.0000	1.0000
USESILLS	0.5721	0.4949	0.0000	1.0000
EDUCATION	13.1542	2.2390	1.0000	20.0000
BLACK	0.1580	0.3647	0.0000	1.0000
HISPANIC	0.0722	0.2589	0.0000	1.0000
OTHER	0.0945	0.2926	0.0000	1.0000
LCO-5	0.4622	0.4986	0.0000	1.0000
LC6-11	0.2170	0.4122	0.0000	1.0000
LC12-17	0.1131	0.3167	0.0000	1.0000
LC18+	0.0873	0.2823	0.0000	1.0000
CONUS	0.6871	0.4637	0.0000	1.0000
HUSBAND'S WAGES	20.2344	9.9161	3.7460	83.9570
EXPERIENCE	12.1538	6.8885	0.0000	46.0000
DISTANCE	3.7447	1.0009	1.0000	5.0000
MONTHS AT LOCALE	23.2564	18.9880	0.0000	120.0000
SPOUSE EMPLOYMENT PROGRAM	0.5290	0.4992	0.0000	1.0000
OFFICER	0.3369	0.4727	0.0000	1.0000
EXPERIENCE SQUARED	194.8988	208.7663	0.0000	2,116.0000
YOUNG CHILD	0.4377	0.4961	0.0000	1.0000
WORK CAREER	0.6564	0.4750	0.0000	1.0000
WORK BASIC NEEDS	0.0958	0.2944	0.0000	1.0000

TABLE 3. CHARACTERISTICS OF MILITARY SPOUSES
BY LABOR FORCE OUTCOME

	LABOR FORCE (%)	EMPLOYED (%)	FULL-TIME (%)	USE SKILL (%)
<u>EDUCATION</u>				
Less Than 12 Years	35	65	67	48
High School Degree	50	76	64	50
Some College	60	79	68	56
College Degree	61	79	68	63
More Than College Degree	73	83	72	75
<u>LOCATION</u>				
Conus	54	77	66	57
Oconus	52	75	66	49
<u>LIFE COURSE STAGE</u>				
Spouse Age Less Than 29 and No Children	67	73	69	52
Youngest Child Age 0-5	41	70	61	51
Youngest Child Age 6-11	61	81	62	56
Youngest Child Age 12-17	68	88	71	65
Youngest Child Age Greater Than 17, or No Children and Spouse Age Greater Than 29	62	80	77	57
<u>SPOUSE EMPLOYMENT PROGRAM</u>				
No	46	77	67	58
Yes	59	76	66	53
ALL	53	77	67	55

As the education of the spouse increases, the percent of the population for each outcome tends to increase. Only 35 percent of Army wives with less than 12 years of education are in the labor force, with 65 percent of these employed. In contrast, 73 percent of the most highly educated are in the labor force, with 83 percent employed.

There is not a large difference in the percent of spouses in the labor force, employed, or level of employment by CONUS/OCONUS location. However, 57 percent of the CONUS spouses are in jobs which use their skills while only 49 percent of OCONUS spouses report that they are using their skills in their job.

Army spouses with children under age 5 have the lowest labor force participation rate (41 percent) and lowest employment rate (70 percent). Of all spouses by life course stage, those with the youngest child between the ages of 12 and 17 have the highest participation rate (68 percent), and also the highest employment rate (88 percent).

Spouses who have access to an on-post employment program have a 59 percent labor force participation rate; those that do not have access to such a program have a 46 percent rate. However, the rate of employment and the percent of full-time workers is not very different for those with and without spouse employment programs. In locations where employment programs are available, there is a slightly lower percent of spouses who report using their skills (53 percent), than for locations where there is not an employment program (58 percent). This is not necessarily a result of the program, however. For instance, the implementation of employment programs may have been initiated first in locations with poor employment opportunities.

IV. ESTIMATION METHOD AND RESULTS

Method

The dependent variable for each of the four work-related models (labor force participation, employed, full-time, and uses skills) is defined as a dichotomous variable. Each of the models assumes that the household is faced with a constrained choice between two alternatives. An appropriate statistical method for estimating the relationships for each model is the probit technique.⁷

Probit Estimation Results

The results of the probit estimation of each model are presented in Table 4. Independent variable means by dependent variable for each model are given in Appendix Tables A1-A4.

In general, the coefficients are interpreted in terms of the direction of change in the probability that the spouse will be in each of the work-related outcomes (i.e., in the labor force, employed, working full-time, or using her skills), given a change in each independent variable.⁸ We divide our discussion of the results into three areas: general labor supply variables, Army non-policy variables and Army policy variables.

Labor Force Participation

The following model was estimated for the likelihood that the spouse was in the labor force (either employed or unemployed):

$$\text{Prob (LFP)} = f\{\text{education, ethnicity (black, hispanic, other),} \\ \text{life course stage (LC0-5, LC6-11, LC12-17, LC18+,} \\ \text{CONUS, husband's wage, experience, experience} \\ \text{squared, distance, months at locale, spouse emp.} \\ \text{program, officer}\}$$

The results are basically in keeping with the findings of earlier studies on the labor force participation of married women.⁹ The results suggest that Army spouses with higher levels of education, black women, and women with

TABLE 4. PROBIT ESTIMATE RESULTS (T-STATISTIC)

INDEPENDENT VARIABLE	LFP	EMPLOYED	FULLTIME	USESKILLS
INTERCEPT	-1.7050 *** (-10.5042)	-0.4454 * (-1.8594)	-0.0263 (-0.1102)	-1.3544 *** (-5.2958)
EDUCATION	0.1264 *** (12.3186)	0.0172 (1.2169)	0.0311 ** (2.0791)	0.0670 *** (4.4355)
BLACK	0.4613 *** (8.0897)	-0.1163 (-1.6183)	0.1373 * (1.7959)	-0.2414 *** (-2.9185)
HISPANIC	-0.0910 (-1.2624)	-0.2608 ** (-2.4374)	-0.0629 (-0.5237)	0.2145 (1.6141)
OTHER	-0.1128 * (-1.7280)	-0.1918 * (-1.8816)	0.0381 (0.3495)	-0.3023 *** (-2.6027)
LCO-5	-0.6968 *** (-10.7639)			
LC6-11	-0.1245 (-1.5449)			
LC12-17	0.2052 ** (2.1457)			
LC18+	0.0907 (0.9264)			
CONUS	0.1384 *** (3.5146)	0.0110 (0.1841)	-0.0569 (-0.9348)	0.1055 (1.6413)
HUSBAND'S WAGES	-0.0208 *** (-5.7789)		0.0056 (-0.9831)	
EXPERIENCE	0.0488 *** (4.7676)	0.0433 *** (3.2567)	0.0015 (0.2564)	0.0134 *** (2.6946)
EXPERIENCE SQUARED	-0.0018 *** (-5.8973)	-0.0013 *** (-2.8317)		
DISTANCE	0.0709 *** (3.9402)	0.1319 *** (4.9655)	0.0412 (1.4805)	0.0477 (1.6128)
MONTHS AT LOCALE	0.0052 *** (5.1522)	0.0166 *** (9.6952)	0.0028 ** (2.0822)	0.0052 *** (3.7058)

TABLE 4. PROBIT ESTIMATE RESULTS (T-STATISTIC) (CONTINUED)

INDEPENDENT VARIABLE	LFP	EMPLOYED	FULLTIME	USESILLS
SPOUSE EMPLOYMENT PROGRAM	0.2419 *** (6.5770)	0.0040 (0.0712)	0.0282 (0.4971)	-0.0887 (-1.4964)
OFFICER	-0.1022 (-1.6163)	0.1891 *** (2.6698)	-0.1430 (-1.4828)	0.0211 (0.2985)
YOUNG CHILD		-0.2444 *** (-4.1337)	-0.2832 *** (-4.4884)	0.0465 (0.7063)
WORK CAREER				0.2375 *** (3.5770)
WORK BASIC NEEDS				-0.2022 * (-1.8769)
=====				
*** T-Statistic significant at 0.01 level				
** T-Statistic significant at 0.05 level				
* T-Statistic significant at 0.10 level				
(-2.0) TIMES LOG LIKELIHOOD RATIO:	798.4975	244.7198	44.2309	124.8272
OBSERVATIONS:				
DEPENDENT VAR=1	2929	2508	1534	1215
DEPENDENT VAR=0	<u>2555</u>	<u>611</u>	<u>810</u>	<u>890</u>
TOTAL	5484	3119	2344	2105

children 12-17 years old are more likely to be in the labor force. The results also suggest, as expected, that women with more years of potential experience are more likely to participate, up to a point, and beyond the point, less likely. Women with pre-school children, and higher reservation wages, appear to be less likely to be in the labor force. An increase in the husbands' wage decreases the likelihood that the spouse is in the labor force. This result is consistent with previous findings and suggests that households with a greater financial need are more likely to have the spouse in the labor force.

Two Army non-policy variables are included in the model: distance and officer. In previous studies, the distance to population centers has been found to have an inverse relationship with labor force participation. Our distance measure is a proxy for actual distance to population centers, with high values associated with nearness. Thus, the positive and statistically significant result found for our distance proxy suggests that the closer the household is to population centers, the more likely the spouse will be in the labor force, and is in keeping with previous studies. Whether the member is an officer has no statistically significant effect on the likelihood that the spouse will be in the labor force.

Three Army policy variables are found to be statistically significant factors on the probability that a spouse is in the labor force. Spouses located in CONUS appear to be more likely to be in the labor force than those OCONUS. One possible explanation for the result is that Army wives in OCONUS locations have fewer opportunities for employment and drop out of the labor force as discouraged workers. As expected, the length of time spent at the location is found to be positively related to labor force participation. The presence of a spouse employment program on the post is also seen to have a statistically significant and positive effect on participation.

Employed vs. Unemployed

For those spouses who are in the labor force, this model examines the determinants of the probability that they are employed.¹⁰ The specification of the model is the following:

$$\text{Prob}(\text{Employed}) = f\{\text{education, ethnicity(black, hispanic, other),} \\ \text{young child, CONUS, experience, experience} \\ \text{squared, distance, months at locale, spouse} \\ \text{emp. program, officer}\}$$

Compared to the specification for whether the spouse is in the labor force, the specification for employment has two major differences. First, a single variable to indicate the presence of a pre-school child in the household has been substituted for the life course stage variables. The hypothesis is that a pre-school child will increase the reservation wage, thereby decreasing the likelihood that the spouse will be observed to be working. Older children in the household are hypothesized to affect the decision to be in the labor force (and were found to be important determinants in that model), but are not likely to be important factors in whether the woman actually finds a job.¹¹

The second difference in this specification is that the husband's income has been omitted. Again, other family income was found to affect labor force participation, but there is no reason to expect that, once the woman enters the labor force, the husband's wage rate will affect the likelihood that she is employed.

The results suggest that Hispanic and other minority spouses are less likely to be employed than white spouses, and, as expected, households with pre-school age children appear to be less likely to be employed than those without pre-school age children. As was the case for labor force participation, potential years of experience is found to have a statistically significant and positive effect on the likelihood of being employed up to a point and, beyond some point, the effect is negative.

With respect to the Army non-policy variables, all else equal, it appears that the spouse of an officer is more likely to be employed than the spouse of an enlisted man. Perhaps some employers discriminate by rank of the serviceman, or perhaps officer wives have better information networks for finding jobs. The results also suggest that households which are located closer to population centers, where jobs are likely to be more available are more likely to have a spouse employed rather than unemployed.

With respect to the Army policy variables, the number of months that the household has been at the present location is found to be a positive and significant factor for whether the spouse is employed. Spouse employment programs and whether the location is CONUS, however, do not appear to be statistically significant factors affecting employment.

Full-time vs. Part-time

For the spouses who are observed to be working, this model examines the determinants of whether they are working full-time versus part-time. The following model is specified:

$$\text{Prob (Full-time)} = f\{\text{education, ethnicity(black, hispanic, other), young child, CONUS, husband's wages, experience, distance, months at locale, spouse emp. program, officer}\}$$

The specification is similar to the specification for whether the spouse is employed, the exception being that the experience squared term is deleted and husband's wage is included. While we hypothesize that potential years of experience has a positive influence on the likelihood that the spouse works full-time, we have no a prior rationale for hypothesizing that, at some point, more years of experience would lead to a lower likelihood of full-time employment. In fact, the results suggest that potential years of experience does not affect the probability that the spouse is a full-time worker.

We also hypothesize that spouses with husbands who earn higher salaries would be less likely to work full-time, because household financial need is less for these households. However, the results suggest that husband's earnings are not statistically significant determinants in the full-time/part-time outcome.

The results also suggest that spouses with higher levels of education and blacks are more likely to work full-time. In addition, women with pre-school age children, who probably face day-care constraints or prefer to have time at home with the child, appear to be more likely to work part-time, rather than full-time.

The two Army non-policy variables, officer and distance, are not found to be statistically significant.

One Army policy variable, the length of time at the location, is found to be statistically significant and positive, and suggests that the longer the household is stationed in an area, the more likely the spouse is to change from part-time to full-time employment. Perhaps there is a tendency to take part-time jobs temporarily until a full-time job opportunity is available. The other Army policy variables, CONUS/OCONUS assignment and whether there is an spouse employment program available on-post, do not appear to be statistically important determinants of the likelihood that the spouse will work full-time.

Underemployment

For spouses who work, this model examines a measure of underemployment status. The dependent variable, "uses skills", is a measure of the degree to which the spouse's job utilizes her training, experience, and skills. A women is defined to be underemployed if she says her current job does not utilize her training, experience, or skills. The following is the specification for the model:

Prob (Uses Skills) = f{education, ethnicity(black, hispanic, other), young child, CONUS, experience, distance, months at locale, spouse emp. program, officer, work career, work basic needs}

The specification is similar to the specification for whether the spouse works full-time, except in this model we have included two motivational factors for working and exclude the husband's wage which is highly correlated with whether there is a financial need. A spouse who says she works only because the household needs her income to meet basic financial needs (work basic needs) is hypothesized to be more likely to accept a job which does not use her background (i.e., underemployed). On the other hand, a spouse whose primary motivation for working is for career development (work career), is hypothesized to be more selective in her choice of job, and to have a job which more closely matches her capabilities. In both cases the estimation results are consistent with the expected influence of these motivational factors, and are statistically significant.

The results also suggest that spouses with higher levels of education and more experience are more likely to be in jobs which use their training and skills. Blacks and other minority spouses appear to be more likely to be underemployed in their jobs than whites.

The Army non-policy variables, officer and distance, are not found to be statistically significant.

The length of time spent at the same location an Army policy variable, is statistically significant and positive factor of the probability of being in a job which uses acquired skills. Like finding full-time work, perhaps spouses need time to find a job (or for a job to become available) which properly matches their skills. The results suggest that those observed to be

underemployed may, if given availability of jobs and enough time in the same location, be able to obtain jobs which more closely match their skills. The other Army policy variables, having a spouse employment program on post and having a CONUS location, do not appear to be statistically significant factors of underemployment status.

Simulation Results

The interpretation of the magnitude of the coefficients in a probit model is difficult because the fitted value from the estimation is not a predicted probability. The probit estimates must be transformed into predicted probabilities before the magnitude of the effects of the estimation parameters can be meaningfully assessed. Table 5 presents simulations performed using the probit estimates to obtain predicted probabilities. Probabilities are estimated for hypothetical households having sample means for all independent variables, and then changes in these probabilities are determined which result from changes in specific variables. The simulation results are revealing because statistical significance of a relationship does not necessarily indicate that the effect of the independent variable on the dependent variable will be large. The simulations present the effects of changes in four independent variables on the probability of each work outcome. The changes examined are in the spouse's education and the three Army policy variables: the number of months at the same location, whether a spouse employment program is available on post, and whether the household is assigned to a CONUS location.

From the information presented in Table 5, we see that if each woman in the sample had a value for each independent variable set at its sample mean for each model (see Appendix Tables A1-A4), then approximately 54 percent of the spouses would be in the labor force, about 83 percent of those in the labor force would be employed, about 65 percent of employed wives would be working full-time, and about 58 percent would be in jobs which use their acquired skills.

TABLE 5. SIMULATION RESULTS

	LFP	EMPLOYED	FULL- TIME	USES SKILLS
Base Probability	.5371	.8268	.6538	.5811
Increase education by 1 std. dev. (+2.39 years)	+.1166*	+.0103	+.0270*	+.0613*
Increase number of months at same location by 1 std. dev (+18.99 mos.)	+.0390*	+.0686*	+.0196*	+.0380*
Spouse Employment Program changed from 0 to 1	+.0959*	+.0010	+.0104	-.0346
CONUS changed from 0 to 1	+.0551*	+.0029	-.0209	+.0414

*Coefficient estimate is statistically significant at the .10 level, or better.

The simulation results indicate expected changes in the average (base) probabilities that would result from changes in the explanatory variables. The magnitude of the effect of changes are best evaluated relative to the base probability of each work outcome.

The simulation results for an increase of one standard deviation in years of education of the spouse (+2.39 years) indicate an increase of .1166 in the probability that the spouse is in the labor force, or about a 22 percent increase in the base probability. Similarly, the model predicts that the increase in education would result in a .027 increase in the likelihood of full-time employment (about a 3 percent increase in the base probability), and a .0613 increase in the likelihood that the spouse is working in a job which uses her skills (about a 6.5 percent increase in the base probability). The simulated increase in education has an insignificant effect on the probability that the spouse is employed. Given that a one standard deviation increase is about an 18 percent increase in years of education, the results suggest that labor force participation is responsive (elastic) to changes in education. Conversely, increases in education appear to have an inelastic effect on the likelihood of employment, whether the spouse is working full-time, and whether she has a job which uses her skills.

An increase of one standard deviation in the number of months that the household is stationed in the same location, about 19 months, is predicted to increase the base probability of labor force participation by about 7 percent, employment by about 8 percent, full-time employment by 3 percent, and whether the spouse uses her skills in the job by about 6.5 percent. This relatively large increase in the time spent in one location (an increase of about 75 percent above the mean in each model), suggests that although a longer period of time in one location has a positive effect on work outcomes, the responsiveness of work outcomes to longer assignments is highly inelastic.

The effect of a spouse employment program on the base probability is simulated by examining the probability of each work outcome with and without an employment program. Spouses who have an employment program on post are predicted to be .0959 more likely to be in the labor force than spouses who do not have an employment program. As a percent of the base probability in the absence of an employment program, this result suggests that an employment program will increase the likelihood of labor force participation by nearly 20 percent. Spouse employment programs are not statistically significant factors in other work outcome models.

The simulation results indicate that spouses who are stationed in the continental U.S. are .0551 more likely to be in the labor force. Relative to the base probability for spouses at OCONUS locations, a CONUS location increases the probability of labor force participation by about 11 percent and increases the probability of having a job which matches skills by 7.5 percent. CONUS locations are not found to be statistically significant factors of employment, full-time employment, or underemployment.

V. SUMMARY AND POLICY IMPLICATIONS

Spouse employment is increasingly a concern for the military because of its relationship to performance, readiness, and retention. This study examines the determinants of four work related outcomes for Army spouses: (1) labor force participation, (2) employment, (3) full-time employment, and (4) using acquired skills in jobs. The 1985 DoD Surveys of Officer and Enlisted Personnel and Military Spouses are used to create a unique data set of Army couples for the analysis. The estimation technique allows us to examine the determinants of the probability of each work outcome, and to simulate the effects of Army policy variables on work outcomes. Important results for policy making clearly emerge.

The results suggest that labor force participation is relatively sensitive to changes in education. A policy or program designed to increase the skills and education of Army spouses would be expected to significantly increase the labor force participation rate of these women. The results indicate that work outcomes are relatively insensitive to the amount of time that households are stationed in the same location. The results suggest that spouse employment programs significantly increase the labor force participation rate of spouses. Finally, a CONUS location appears to have a moderate positive affect on labor force participation.

With respect to the general labor supply model, our results are in keeping with the findings of earlier studies on the labor force participation of married women.

ENDNOTES

1. For a comprehensive literature review of the theory and empirical evidence of factors affecting the spouse employment decision and employment outcomes, see "Army Spouse Employment Literature Review," Research Triangle Institute, 1987 and Killingsworth, 1983.

2. Ideally, a reduced form model would also include demand-side labor market variables. Unfortunately, we have few good measures of purely exogenous demand factors for the women and households in our sample (CONUS/OCONUS is an example of one that we use). Thus, the model is essentially a reduced-form labor supply model with the determinants of the market and reservation wages entered directly.

3. In the model of underemployment we exclude the member's income from the estimation because of its collinearity with the spouse's response to whether she works because of a household need to meet basic family expenses.

4. See Griffith, et al. (1986) for a complete description of the survey design and detailed information about the sample, data collection, response rates, and the questionnaires.

5. Note that average age is not shown in Table 2, however potential experience is calculated from age and education. (Potential experience = age - years of education - 6).

6. It should be noted that the two-way cross-tabulations shown in Table 3 simply give the bivariate relationship between the independent variable and each outcome. Unlike regression models, all other variables are not held constant.

7. In the case of a limited dependent variable, ordinary least squares estimation leads to inefficient estimates, and there is no guarantee that predictions will lie within the (0,1) probability interval. The probit method overcomes these limitations.

8. The coefficients indicate the direction of change in the likelihood of being in each outcome and the asymptotic t-statistics give the degree of confidence of the estimate. The magnitude of the change in probability, given a change in any independent variable, requires simulation analysis.

9. See endnote #1.

10. Our intent in this analysis (and in subsequent models presented in this paper) is to examine spouses in separate work outcome categories conditional on being in each subset. Because our intent is not to make inferences about the entire population of spouses from those spouses who are in the labor force), there is no selectivity bias problem.

11. Early estimates of the model indicated that the life course variable categories for older children in the household were statistically insignificant, and they were subsequently dropped.

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APPENDIX A

ADDITIONAL TABLES

TABLE A1. LABOR FORCE PARTICIPATION MODEL MEANS

VARIABLE	NOT IN LABOR FORCE	IN LABOR FORCE	ALL
INTERCEPT	1.0000	1.0000	1.0000
EDUCATION	12.8967	13.5654	13.2538
BLACK	0.0798	0.1717	0.1289
HISPANIC	0.0736	0.0608	0.0667
OTHER	0.1084	0.0703	0.0881
LCO-5	0.5722	0.3503	0.4537
LC6-11	0.1930	0.2571	0.2272
LC12-17	0.0853	0.1550	0.1225
LC18+	0.0732	0.1031	0.0892
CONUS	0.6654	0.6931	0.6802
HUSBAND'S WAGES	20.7264	20.1431	20.4148
DISTANCE	3.6818	3.7948	3.7422
MONTHS AT LOCALE	22.5174	25.7002	24.2174
SPOUSE EMPLOYMENT PROGRAM	0.4814	0.5906	0.5398
OFFICER	0.3746	0.3479	0.3603
EXPERIENCE SQUARED	200.4611	191.9775	195.9300

TABLE A2. EMPLOYMENT MODEL MEANS

VARIABLE	UNEMPLOYED	EMPLOYED	ALL
INTERCEPT	1.0000	1.0000	1.0000
BLACK	0.2095	0.1643	0.1731
HISPANIC	0.0851	0.0538	0.0600
OTHER	0.0949	0.0682	0.0734
CONUS	0.6694	0.6978	0.6922
EDUCATION	13.2635	13.6248	13.5540
YOUNG CHILD	0.4337	0.3034	0.3290
DISTANCE	3.5646	3.8636	3.8051
MONTHS AT LOCALE	17.9018	27.7257	25.8012
SPOUSE EMPLOYMENT PROGRAM	0.6121	0.5865	0.5915
OFFICER	0.2520	0.3660	0.3437
EXPERIENCE SQUARED	165.7921	205.7301	197.9064
EXPERIENCE	11.0098	12.7963	12.4463

TABLE A3. FULL TIME WORK MODEL MEANS

VARIABLE	PART-TIME	FULL-TIME	ALL
INTERCEPT	1.0000	1.0000	1.0000
EDUCATION	13.5988	13.6307	13.6197
EXPERIENCE	12.6691	12.8875	12.8122
SPOUSE EMPLOYMENT PROGRAM	0.5802	0.6027	0.5950
DISTANCE	3.8148	3.8771	3.8556
YOUNG CHILD	0.3432	0.2620	0.2900
MONTHS AT LOCALE	26.2667	28.3882	27.6563
CONUS	0.7111	0.6873	0.6955
OFFICER	0.3938	0.3394	0.3582
HUSBAND'S WAGES	21.1734	20.4676	20.7111
BLACK	0.1481	0.1812	0.1698
HISPANIC	0.0580	0.0528	0.0546
OTHER	0.0679	0.0717	0.0739

TABLE A4. UNDEREMPLOYED MODEL MEANS

VARIABLE	DOES NOT USE SKILLS	USES SKILLS	ALL
INTERCEPT	1.0000	1.0000	1.0000
EDUCATION	13.3292	14.0058	13.7197
BLACK	0.1697	0.1309	0.1473
HISPANIC	0.0404	0.0584	0.0508
OTHER	0.0888	0.0477	0.0651
CONUS	0.6831	0.7342	0.7126
DISTANCE	3.8079	3.9300	3.8784
EXPERIENCE	12.4798	13.1720	12.8793
OFFICER	0.3281	0.4255	0.3843
SPOUSE EMPLOYMENT PROGRAM	0.6157	0.5531	0.5796
YOUNG CHILD	0.3011	0.2856	0.2922
WORK CAREER	0.5876	0.6955	0.6499
WORK BASIC NEEDS	0.1180	0.0683	0.0893
MONTHS AT LOCALE	25.6258	29.4996	27.8618